SUPPLEMENT.

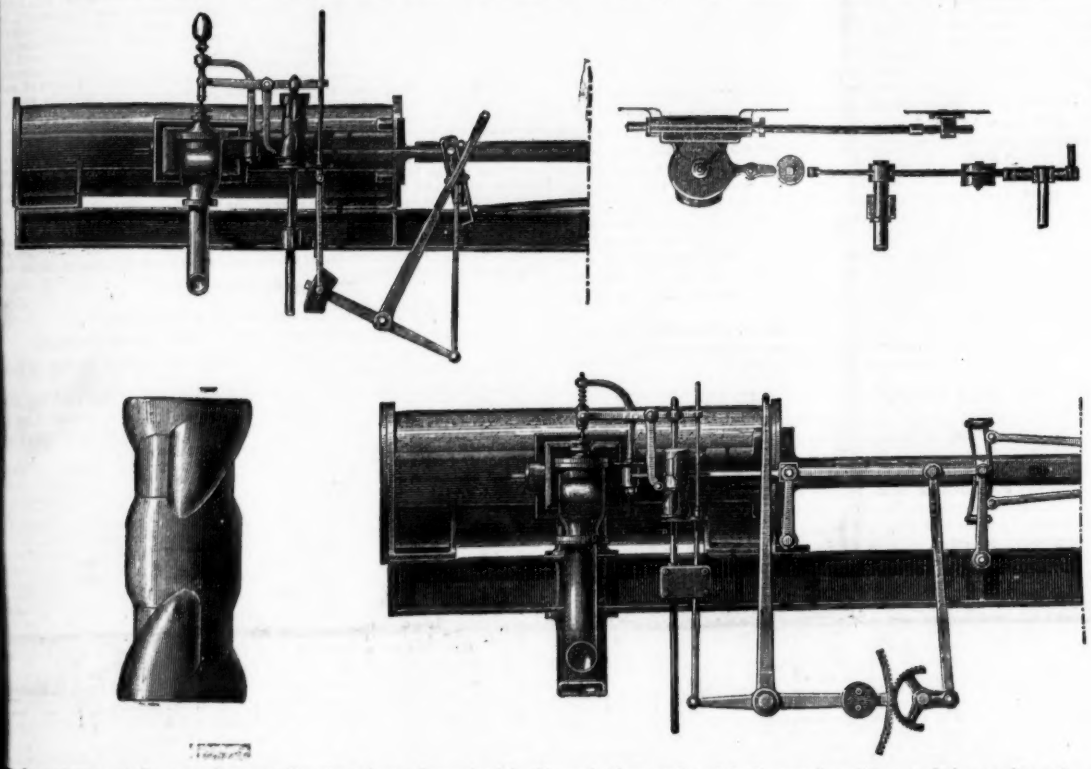
The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

No. 1819.—Vol. XL. LONDON, SATURDAY, JULY 2, 1870. {STAMPED .. SIXPENCE. UNSTAMPED, FIVEPENCE

VARIABLE EXPANSION GEAR FOR WINDING ENGINES.



Reference was made some few months since to an important in- tion introduced by Mr. AUDEMAR, the engineer of the Blanzy es, and an opportunity is now afforded for giving some further ticulars concerning it. It has already been explained that the ap- ation of expansion gear to engines ensures an important economy uel, yet hitherto winding-engines have been worked without it. many conditions to be satisfied render it, indeed, difficult to ap- and cause mine owners who use unsaleable debris for the raising team to hesitate before adopting it. But special circumstances e now made its application unusually desirable—the want of r space consequent upon the daily increasing activity at the pits. s, obliged as they would be to buy new boilers, it has been deemed erable to utilise to a greater degree the steam already at their osal, by causing it to produce more useful work by using it ex- ively. This secures not only the advantage of diminished con- ption of fuel, but also renders available part of the boilers, the ber of which had become insufficient.

om the above engravings, to which we are indebted to *La Houille*, journal devoted to the coal and iron trades of France, it will be that Mr. Audemar's apparatus consists of a double cam, one- of which serves for the forward stroke, and the other half for back stroke. Each portion of this cam has varied profiles, so give the various degrees of expansion, from the smallest to the test; and it is so disposed that the middle becomes the neutral t, like that of the Stephenson slide, and corresponds, like it, to dmission, while the two extreme points give full open. A valve he Cornish system, placed before the ordinary distribution of achine, is used to produce the expansion of the steam. This is put in motion by a cam, the rotation of which is caused by earing onthe shaft of the engine, and it opens and closes accord- s one or other part of the cam is for the time being in operation. e Stephenson slide be at its neutral point, the cam would be in ilar position, and the two being set in motion by the same will at the same time occupy the extremes of their course. If, the engineer inclines his reversing lever, the several profiles of am being presented to the valve, produce a corresponding cut- hich will become absolutely none if the lever be pushed full . Thus, the mere inclination of the lever which the engineer dy uses, suffices to produce the desired effect both for the for- and backward movement.

e apparatus in question has given the most satisfactory results, as been found to work most satisfactorily in connection with achines to which it has been applied, a saving of at least 50 per in the boilers and fuel being claimed for it. It is remarked engineers, however, scarcely require figures since the effect of ing steam expansively has been ascertained in the working of nes employed for other industrial purposes, and that Mr. Aude- 's invention fulfils all the conditions necessary for the satisfac- working of the winding-engines. It can be made to work with ithout the stop at any instant, and can thus start and stop with ity at any portion of the stroke; the variable cut-off can be ap- at pleasure, and may be regulated by the resistance to be over- ; it is unnecessary for the engine-tenter, whose attention is dy fully occupied, to pay any attention whatever to the new ratus, and as the number of levers he has to attend to is not in- ed, no additional physical effort is required. It will be seen he stop is formed of a double-seated valve, placed a little in of the ordinary port of the machine, this valve being controlled ouble cam regulating the movement of the Stephenson slide. o extremities of this cam are so arranged as to keep the valve pen, and the other parts act upon the stop for the fore and troke. The operation of the apparatus is this—The engine- has still nothing to attend to but the reversing lever; when inclined toward the end of the stroke, the engine is freed from p; this must be done each time the engine is started. The lever is then replaced in its usual position, and the engine acts ex- pansively and economically during the remainder of the working.

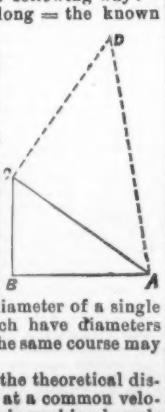
The improvement can be applied to all kinds of winding-engines, whatever may be their construction, by placing a valve upon the steam supply-pipe, and giving a rotatory movement to the cam. Upon several engines Mr. Audemar has found it more convenient to place the cam horizontally, and it is obvious that it may be made of various forms, without departing from the principle. In one arrangement shown above it will be seen that the connection between the cam and the Stephenson slide is effected by the sector, which prevents the contraction of the ports when considerable expansion is used

An essential feature of the invention is claimed to be that the objections to the Stephenson slide when not at the extremities of its course are avoided. The connection of the slide with the cam is, in fact, made by intermediate sectors, so that the speed of the two parts is widely different. Thus the slide always occupies the end of its course, and gives the maximum opening to the ports, although the cam is sufficiently advanced to produce considerable expansion. The system, which appears to be free from complications, and which has been practically applied, has enabled the Blanzy Company to dispense with the purchase of boilers, which had become indispensable, and to secure in addition a saving of fuel equal in some cases to 40 per cent. And they were enabled in one case of four boilers already over-worked to put one out, for the purpose of cleaning. These results are so remarkable that the general adoption of the invention is confidently anticipated; and, as all the parts are ready made, the stoppage for a single day is sufficient to apply the arrangements to existing engines; and they, moreover, meet the approval of the workmen, because they do not at all interfere with their existing habits.

Original Correspondence.

RELATIVE DIAMETERS OF PUMPS.

Occasionally it is required to substitute one single pump for doing the work of two or more others. Suppose two pumps, of 8 and 6 inches diameter respectively, have to be replaced by a single pump, capable of raising the same quantity of water as the other two—the velocity of the pump-rods being the same in each case—then the size of the pump to be substituted may be found in the following way:—Either full size, or to any scale, draw A B 8 in. long = the known diameter of one pump, and at right angles to A B draw B C 6 in. long = the known diameter of the other pump. Then the length of line, A C, in this instance 10 in., shall be the diameter of the single pump, which, theoretically, is equal to the other two. The same holds good for pumps of any sizes, and, for the guidance of workmen, it need only be impressed that the *diameters* refer to the *working barrels* or *plungers* of the pumps, and that C B must always be drawn at *right angles* to A B. If the single pump be intended to replace *three* others, any *two* of them should be first dealt with as above, and afterwards the line C D, representing the diameter of the third pump—which, in this case, we will suppose to be 10 in.—is drawn at right angles to A C, then A D shall represent the diameter of a single pump, equal, theoretically, to three pumps, which have diameters represented by A B, B C, and C D respectively. The same course may be followed for any greater number of pumps.



The foregoing easily admits of proof, because the theoretical discharge of pumps of different diameters, working at a common velocity, is in proportion to the circular areas of their working barrels or plungers, as the case may be, and it is a property of circles that their areas vary as the squares of their diameters. Now, as A B C is a right-angled triangle, the square of A C equals the sum of the squares of A B and B C (Eu. I., 47); consequently, a circle or pump of which A C is the diameter is equal in area or discharge to two circles or pumps of which A B and B C are diameters. In the same manner, A D may be shown to be the diameter of a pump equal to two pumps of which A C and C D are diameters; but A C has been shown to be the diameter of a pump equal to the two pumps having the diameters A B and B C—therefore, A D (in this case about 14½ in.) represents the diameter of a pump equal to the three pumps represented respectively by A B, B C, and C D.

Arithmetically, $A C = \sqrt{A B^2 + B C^2}$

$A D = \sqrt{A B^2 + B C^2 + C D^2}$

and so on for any number of pumps.

Should it be required to find the diameter B C of a pump which, when working with another one of given size A B, shall be together equal to one large pump of known diameter A C, then

$B C = \sqrt{A C^2 - A B^2}$

If, when working with *two* others of given size, A B and C D, to equa one A D, then $B C = \sqrt{A D^2 - (A B^2 + C D^2}$.

Bristol School of Mines. —— WILLIAM MORGANS.

COAL-CUTTING MACHINERY.

SIR,—I have read with much interest Mr. Rothery's letter on Coal-Cutting Machinery, but cannot agree with him that the last form of machine which he proposes would prove of practical utility in getting coal. Indeed, it seems to be objectionable in every possible respect, and I have no doubt that when Mr. Rothery tests it he will find it to be so. To cut a groove in coal ¼ in. wide and 12 in. deep with a pick is out of the question, and if the groove be horizontal it would be almost impossible, as the groove would quickly become so choked that the power required to move the pick would be enormous. I believe this to be, perhaps, the greatest objection to the saw and scraper machines, but if a ¼-in. groove be desirable the scraper machine is the only one to do it. It appears to me that the great advantage of the pick machine is that, owing to the character of the blow it gives, the coal is brought away in splinters instead of powder, so that the coal removed from the space in which the machine acts is not in an unsaleable state; but a ¼-in. pick machine would pound up the coal as finely as possible; in fact, it would have all the disadvantages of the circular saw with none of its advantages. A pick but ¼ in. thick is really only like one-tooth of a circular saw; and the disadvantage is that whilst the motion of a saw-tooth is continuously forward, the pick has the objection that during the back stroke there is necessarily a waste of time.

To secure sufficient strength in a pick only ¼ in. thick it must really be made in the form of a blade, and difficulty in sharpening it could scarcely be avoided. Whether the circular saws recently introduced in America with movable teeth could be advantageously introduced for coal cutting I do not know, but I am convinced that a saw with such teeth would be infinitely superior to a pick of ¼ in. thickness. In kirving, either with a hand-pick or a pick-machine, a certain space is cleared by each blow through the removal of splinters of coal, and thus the next blow takes full effect, but where a circular saw is used there is always a tendency to tighten, necessitating, of course, the application of increased power. Again, the multiplication of cylinders in Mr. Rothery's machine would be very objectionable, each small cylinder would cost almost as much to make as the one large one, and each would certainly be more troublesome and expensive to keep in efficient working order. As to the substitution of cutting in the manner described by Mr. Rothery for blasting, I think all practical men will at once pronounce it impracticable, but I do not think there would be much objection to his arrangement for cutting one side of the coal, so as to permit of its being more readily broken down by hydraulic apparatus.

Newcastle, June 29. —— CARBON.

THE METALS AND THEIR ORES—No. VII.

SIR,—Some of the metals are met with in their native or metallic state, but generally in limited quantities only, and it seldom happens that they are absolutely pure, being frequently more or less mineralised, mechanically mixed, or alloyed with each other. Thus, native gold is frequently alloyed with native copper or silver, and sometimes with palladium and rhodium. Native silver is usually found associated with native copper, and the native metals platinum, iridium, rhodium, osmium, and palladium are also occasionally met with in the same alloy. Native tellurium is often alloyed with gold.

The most valuable of the native metals are generally found both in the older sedimentary strata and igneous rocks, and also in the sands and drifts from such rocks. Native gold is commonly found in the quartzose veins, traversing the metamorphic sub-crystalline slate rocks, and both gold and platinum are discovered in the alluvial deposits and gravel or sands of rivers washed from these rocks; and native silver is not unfrequently met with in the igneous rocks adjacent to porphyritic trap dykes.

The principal metals found native are—

Arsenic.	Iridium.	Rhodium.
Bismuth.	Mercury.	Tellurium.
Copper.	Palladium.	Silver.
Gold.	Platinum.	

The metals are found far more numerously associated with other elementary and non-metallic or mineral substances, forming compounds or combinations called metallic ores; and it is from these sources that the metals employed in the industrial arts are chiefly obtained.

The metallic ores are widely, but far from uniformly, distributed throughout the earth's crust, and are met with under various circumstances. Some species are found associated with the rocks of almost all ages, through which they are disseminated in granular particles; others, again, form nearly horizontal layers, or beds, betwixt the rocks; whilst the more frequently occurring ores are met with in the almost vertical fissures or cracks in the earth's crust, called veins or lodes, traversing the rocks (chiefly those of the older formations) in tolerably uniform directions. In some districts a vein is found to be more productive in ore the more nearly its strike or run approaches an easterly or westerly direction, whilst in other localities a north and south direction is the most favourable. It

also frequently happens that the east and west veins in a district produce in greater abundance the metallic ores of one class, whilst the north and south lodes of the same neighbourhood yield different kinds of ore quite as prolifically.

Local causes, and primarily the class and nature of the rocks in which the veins are embedded, and through which they pass, greatly tend, however, to modify their character and productiveness, so that although well-defined general laws may be laid down in studying metallic veins, and for guidance in working them, still these laws must always be subject to the modifications just referred to, as an axiom which would be perfectly reliable in one district might altogether mislead and fail if applied without reservation in another, and the rule laid down only be proved so by exception.

The subject of the formation of veins, and of the various ores met in the lodes of different localities, and the mode of working them, will be more fully treated at a subsequent period in these letters.

The following are the most generally occurring ore-producing combinations between metallic and non-metallic elementary substances—

OXYGEN.—This element is an invisible, colourless gas, somewhat heavier than air, of which it constitutes one-fifth by bulk. It also enters largely into the composition of water, of which it constitutes one-third. It possesses neither taste nor smell, and is an energetic supporter of combustion.

All the metals are capable of combining with oxygen, forming oxides, and some of them bases and acids, but they differ considerably in their relative attraction for it, and do not all unite with the gas in the same proportion, some of them having but one whilst others have several degrees or proportions of oxidation. Some of the oxides are soluble in water, but they are mostly insoluble. The oxides which are capable of being reduced to the metallic state by the action of heat alone are—

Gold,	Osmium.	Rhodium.
Iridium.	Palladium.	Ruthenium.
Mercury.	Platinum,	Silver.

These are denominated the noble metals.

The description of the combinations between the metallic and non-metallic elements will be resumed in my next paper.

Mining Offices, Shrewsbury, June 27. EDW. GLEDHILL.

EBERHARDT AND AURORA MINING COMPANY.

SIR,—Permit me, as an old resident of Nevada, to compare some of the statements put forth at the meeting of this company with the actual results obtained from *all* the White Pine Mines during the past quarter. I should add that all the mines are required to make this return to the United States Government quarterly, and it is, therefore, reliable.

According to the Chairman's statement, the net profit is estimated to be 96,000*l.* per annum, obtained from $40 rock, the expense of mining and milling on which is to be $20 per ton. To produce this result they are to wash from the two mines, in round figures, 22,000 tons of rock per annum the gross yield on which is to be $960,000, and the net profit $480,000 ($5 to the 1*l.* for convenience).

At this rate, then, these mines are to give every quarter 5500 tons; $220,000 gross yield; $110,000 net profit.

The actual results of *all* the White Pine Mines for the past quarter has been 9092 tons 75 lbs.; $295,566·82 gross yield; $113,726·82 net profit, on basis of $20 per ton for expenses.

Thus, then, the Eberhardt and Aurora Mining Company (Limited) proposes to make quarterly profits within a trifle of that made by all the mines in the district.

Verily, here is food for reflection.

I conclude with the Chairman's own words—"Attempts will be made to introduce many companies upon the London market, and amongst them will be many a 'bogus,' as it is styled in California; this word is sufficiently ugly and suggestive to need no explanation, and he would advise the unwary to do as they have done—'Look before you leap.'" P.

GENERAL MINING ASSOCIATION.

SIR,—May I beg the favour of your giving insertion to the fact, that at the meeting of the proprietors which was held on June 21, and noticed in last week's Journal, votes of thanks were cordially given to the committee of investigation, and also one to the Chairman (*pro tem.* of the meeting) for his conduct in the chair, but no mention whatever was made of one to the directors, as by the adoption of the report of the committee of investigation the management of the board had been greatly censured, and concurred in by those proprietors who were present.

T. E. BIGGE,
Late Chairman of the Investigation Committee.

GENERAL MINING ASSOCIATION.

SIR,—In justice to Mr. Ruding, may I ask the favour of your correction of an error which appears in the report of the general meeting of the company, as published in last week's Journal. It is therein stated that he was "accountant to the committee." This is not a fact. He, like all the members of the committee, gave his labour and time during 12 months gratuitously, and the proprietors present at the meeting warmly recognised his services, and that part of the report which was essentially his own—the accounts.

T. E. BIGGE, Lieut.-Col.,
Late Chairman of the Committee of Investigation.

Bryanston-square, June 29.

[ADVERTISEMENT.]

VIRTUOUS LADY MINE—THE QUEEN.

SIR,—Your correspondent of last week, "A Queen Shareholder," is quite correct; rocks of copper are now being raised to surface. As regards my silence, they say "discretion is the better part of valour." Besides, I confess to being crestfallen, and awfully disappointed and mortified at the turn things have taken. It is I who have been deceived; my faith was genuine, or I should certainly have sold out a considerable portion of my thousands of shares last Christmas, when I had the opportunity of getting 3*l.* or 3*l.* for them. I have, however, as much faith as ever in the future of the mine—in fact, more, as I believe that the one lode worked for generations, ever since the days of "Good Queen Bess," is about the poorest and most speculative part of the extensive Virtuous Lady sett; albeit the excavations must have cost at least several millions sterling, and the debris outside of the mine would not one hundredth part fill up the chasms underground from whence corper ore has been taken. In our little way we have spent 2400*l.*, and the work we have done, compared to the old workings, is very similar to a drop of water flowing into the ocean.

In as few words as possible I will explain how my calculations have been all thrown out. In the 24 fm. level I was told that we should get the north lode in the shaft, and could then sink upon it; there is no lode at all in the shaft, it is many fathoms off, cut by a cross-cut level, which is now being cleared. The result is, we intend to sink the shaft perpendicular through the country down to the 40, and there drive and cut the great north lode, and go right across it, and it is possible, as it has been so rich above, that we may have a more defined and very valuable lode at that point.

The south lode, as it is called, instead of underlying north 3 feet in a fathom, as originally, is now dipping south 4 feet in a fathom, and this will account for our not having seen the lode ere this in the cross-cut. It may be 20 fathoms off, but, after all, setting time aside, it is an advantage, as a few further fathoms driving, after seeing the south lode, would cut the caunter, and thus open up quite a new mine. Whoever says that there is not every prospect of a successful mine here knows nothing at all about mining; however, I cannot get any practical man to go so far as that, as it always ends with "It is a perfect mystery." Well, granted, and we are about to solve it, only we must have time.

The whole of the 150 shareholders have been duly invited to attend the meeting next Wednesday, at the count-house on the mine, and they will then be able to see and judge for themselves.

QUEEN.—Some of our noted mining men have never had a prize in their lives, although they have had *carte blanche* in the expenditure of hundreds of thousands of pounds; others have chuckled with delight at one out of fifty, so one out of two cannot be so bad for a young beginner. Some say the Virtuous Lady is a failure; I deny it *in toto*; however, no one can dispute the success of the Queen. This is not the regular week for Capt. Knott's communication to your Journal, but I have just had a letter from him that would astound some of your readers. Suffice it to say, that in nine days we have raised 1 ton of silver stuff that will yield 300 ozs. of silver per ton, at a cost of less than 75*s.*, and worth 75*l.*, and the grandest feature of all is that Captain Knott informs me this is only a preliminary and just a quiet start to begin with, and bids me hold my shares, as success is absolutely certain, both in the silver and copper departments. My price for Queen shares is now 2*l.*, and without a doubt they will very shortly be up to 10*l.*, and a mad rush made after them, as 300 ozs. of pure silver in nine days is a matter that not another mine in England can at present boast of, especially when it is taken into consideration that the present is but an omen of the bright future. T. J. BARNARD.

Tavistock, June 30.

THE QUEEN SILVER AND LEAD MINE.

SIR,—Being down in Devonshire and Cornwall on business a few days ago, and having previously heard a good deal about this mine, curiosity led me to pay a visit to it, and certainly I was greatly astonished with what I saw. I must confess that I went prejudiced against it, but my opinion was so changed with what I saw that I at once made application for 500 shares, and am pleased to say that I have this day succeeded in obtaining them, and have just returned transfer duly signed, with cheque.

I was shown over this property by the agent, Capt. Knott. There appears to me, although not a practical miner, a certainty of success. I saw a large pile of copper and mundic ore, which I was informed had been sold only a day or two before my visit at a good profit. I also brought away with me some very fine specimens of silver ore, said to contain over 300 ozs. per ton; this to me seems a stounding, seeing that it is obtained at so shallow a depth, with every reasonable probability of a great increase when the junction of the lode is reached, and it appears to me to be making off in the direction for the junction. I may say that, although not a practical miner, I have a theoretical knowledge, having invested large sums in mining. I have posted myself up in mineralogy from some of the best writers extant, and never invest now without first seeing the property myself.

I have every confidence in this property becoming a great success, and that confidence has been greatly strengthened since I saw the report of Dr. T. L. Phipson, in the Supplement to last week's Journal Several friends (engaged in mining) who have called at my office have been as much surprised as I was myself with the quantity of silver contained in the stones I brought away with me, and have expressed a desire to obtain shares. I may just repeat, I was not prepared to see nearly so much ore, and certainly not the quality. INVESTOR.

Manchester, June 29.

THE LONDON, BRIGHTON, AND SOUTH COAST RAILWAY COMPANY.

SIR,—The following estimate of the six months' accounts of the Brighton Railway Company, ending June 30, 1870, may, perhaps, be of interest to holders of original stock, as calculated to throw some light upon the probability of their receiving a dividend at the end of the half-year:—

The expenditure on capital account in the half-year ending June 30, 1869, amounted to	£207,815	5	5
The amount of further expenditure in the half-year ending December 31, 1869, was	137,646	15	10
Making a total of	£345,462	1	3

The interest on this amount will have to be paid in the current half-year, and may be calculated at 5 per cent., as the 4½ per cent. debenture stock, raised to furnish the above amount, was issued at a discount.

This will give a sum of	£ 8,636	11	0
The estimated expenditure on capital account for the present half-year was 179,000*l.*, upon which a further sum for interest will have to be paid, but the amount of which cannot at present be estimated.			
There was a falling off in the amount of traffic receipts to June 18, 1870, as compared with the corresponding half-year of 1869, of	6,741	0	0
In the last half there was paid 45,294*l.* 9*s.* for compensation on account of the New Cross accident, and the sum required to meet the claims since made is variously estimated at 30,000*l.* to 35,000*l.*	30,000	0	0
Taking the lowest amount there must be added			
Total	£45,377	11	0
In the first half-year of 1869, after paying the preference dividends, there remained for the proprietors of original stock the sum of only	2,678	10	9
Which makes the probable deficiency	£42,699	0	3
This will be reduced by the balance brought from December, 1869, amounting to	1,092	0	11
Leaving a total deficiency of	£41,606	19	4

The inference to be drawn from the preceding statement is that the original shareholders will not only have no dividend, but, unless the preference dividends are paid out of future earnings, the holders of the latter stock will be deprived of their income to that extent.

It is much to be regretted that so large and valuable a property, which has been of so much service to the public, should be so ruinous to the shareholders; and that having in former years earned the character of the Railway Consols, and for a long time paid a dividend of 6 per cent., it can now pay no dividend at all, but will most probably show a deficiency this half-year of nearly 42,000*l.* in the amount required to pay its preference interest.

27, *Walbrook, June 29.* J. W. RICHARDS ADAMS.

[For remainder of Original Correspondence, see this day's Journal.]

CAST AND WROUGHT IRON FOR BUILDING.

The fourth edition of Sir WILLIAM FAIRBAIRN'S well-known work "On the Application of Cast and Wrought Iron to Building Purposes," has just been issued by Messrs. Longmans; and as additions have been made, bringing the information down to the present time, its value will continue to be as highly appreciated as hitherto. The use of iron in the constructive arts has now become so extensive that it is absolutely essential that all engaged in connection with them should possess a sound practical knowledge of the application of iron in its combination with other materials in the construction of fire proof buildings, and this is precisely the description which Sir W. Fairbairn offers in the present work. That in the earlier application of iron to constructive purposes great want of judgment was, as the author observes, displayed in many cases cannot be questioned, and this was, no doubt, in a great measure due to the neglect by practical men of the knowledge offered them by experimentalists and mathematicians. The portion of the book in which the advantages of wrought-iron beams or joists are recommended in substitution of the more cumbersome and uncertain ones of cast-iron frequently used was regarded as the most important, as in it the perfect efficiency of malleable iron beams was proved by numerous examples, and the author pointed out that the more extensive adoption of them was alone wanting to excite the attention of the iron manufacturer, and induce that application of talent and capital which would speedily reduce the cost of production. The three years which elapsed between the issue of the first and second editions confirmed him in the opinion he had expressed concerning cast-iron beams, and enabled him to add some tables of the results of experimental researches into the strength and constitution of iron, and its improvement by certain processes of manufacture. The opinion he had expressed with regard to the uncertain character was confirmed by his subsequent experience, and he repeated his advice to exercise great caution in their employment, from the conviction that they were equally unsound in principle and dangerous in practice.

Wrought-iron bridges were scarcely thought of when the first edition of Sir Wm. Fairbairn's book was issued, but in the second he added a section on the subject, containing such results of experimental research as appeared to be applicable to those constructions, together with the mathematical formulae deduced from them, rules for calculating the strength and proportioning the parts, and examples of works either erected or in course of construction. Between the issue of the second and third editions a period of seven years elapsed. By this time wrought-iron beams and girders were to some extent superseding the use of cast-iron, but the author had still to express his regret that architects did not avail themselves of a material so admirably adapted as wrought iron for strength and security from fire to a greater extent than had hitherto been adopted. He suggested that rolled iron joists, similar to those extensively used by French architects, would render the whole construction fire-proof, save a high rate of insurance, and enhance the value and permanency of the structure. Experiments had been made on homogeneous iron and steel as applied to beams and bridges, but the manufacture, although greatly improved, was not then sufficiently advanced to ensure safety in the use of the new material; and he explained that this did not so much arise from want of knowledge of its mechanical and chemical compounds as from want of uniformity in the manufacture.

The new edition contains a considerable amount of new matter, including an experimental enquiry into the durability of wrought-iron beams and girders, the influence of the force of impact, and a long series of changes of variable loads affecting their ultimate powers of resistance. These researches are of high importance when considered as a safeguard to the amount of load or strain to which beams and girders are usually subjected; and he also gives the result of some experimental researches on the properties of steel and homogeneous iron, to which the architect and engineer may safely refer.

To attempt to dilate upon the merits of a work of so eminently a useful character as that of Sir Wm. Fairbairn, after it has passed through four editions, would be superfluous; but it may be stated that it has been rendered complete by bringing the information down to the present moment.

MECHANICAL PREPARATION OF ORES.*

The art of separating, cleansing, and concentrating minerals and ores by mechanical means has made great progress during the last 20 years. Not only have great improvements and modifications been made in machines and processes long in use, and many new and important machines been invented, but the construction of all machinery for these purposes has been carried to a great degree of accuracy and perfection. With these improved machines it is possible to obtain economical results of great importance, and to a great extent to supersede hand labour in ore dressing, and at the same time to perform the work better, and with greater rapidity, so that rough ores, which were formerly too poor to be worked, can now be concentrated with profit. The report contains a large amount of information, but having been drawn up by Frenchmen, and then translated by the United States Commissioners, many German and other inventions, not French, have been passed over with the briefest mention. Thus, the apparatus of Hundt in the Prussian section, described some time since in the *Mining Journal*, is disposed of in four lines; and that of Kittinger in the Austrian in 13 lines, whilst a comparatively worthless machine of Huet and Geyler (the Commissioners' employees) has immediately afterwards a couple of pages devoted to it.

The preliminary breaking of large masses of ore is now effected to a great extent in Europe and the United States by Blake's Stone-Breaker (manufactured in this country by Mr. H. R. Marsden, of Leeds). The machine, as is well known, consists essentially of a strong iron frame supporting upright convergent iron jaws actuated by a revolving shaft. The ore to be broken is dropped between these jaws, and a short reciprocating or vibratory motion being given to one or both of them, the stones are crushed, and drop lower and lower in the converging or wedged shape space, until they are sufficiently broken to drop out at the bottom. The size of the broken fragments may be regulated by increasing or diminishing the size of this opening between the jaws. Messrs. Huet and Geyler, the French manufacturers of the machine, seek to increase the fineness of the product by placing an obturator or obstruction, such as a triangular bar of iron, under the outlet between the jaws, arranging it so that it can be raised or lowered by means of screws so as to diminish or increase the size of the outlet for the delivery of the crushed stuff. The effect of this obstruction is to retain the stuff between the jaws until it is so much broken and comminuted that it will sift through the narrow slits left on each side of the bar. This method of operating is successful with some materials, but involves a considerable expenditure of power, and it is attended with some danger to the machine. The fragments of ore produced by stone-breakers are better adapted in size and shape to washing and concentration by jigging than those from rollers and stamps. With hard and silicious rocks the breakers work dry, but when the ores are argillaceous, and are inclined to pack, it is necessary to employ a large quantity of water to obtain the best results.

A modification of the well known Cornish crusher was exhibited, wherein springs of vulcanised India-rubber are substituted for the lever counterpoise usually employed to keep the surface of the rolls in contact. With springs the resistance increases as the rolls become more and more widely separated by the stuff to be crushed. In stamps, those exhibited by Mr. P. Rittinger, of Austria, are especially noticed. The general construction is the same as in common use, with the difference that a water box is adapted to the front of the grates, so that they are wholly or partly immersed in water. The swash and strong currents produced by the fall of the stamps wash both faces of the grates, and keep the openings clean and free, so that the stuff passes more rapidly, while at the same time a delivery or escape pipe, leading from the bottom of the water-box considerably below the level of the water in the mortar, determines a strong and constant current through the meshes of the grates outward. An increase of the product, with a diminution in the amount of slime, is claimed to be the result of this construction. The crushed stuff passes off with the water through the escape pipe, and the amount of water required is less than in ordinary construction.

In connection with the machines for classifying and sizing crushed ores, it is mentioned that when perforated plates are used instead of wire screens, it is essential that the thickness of the perforated plates should always be less than the diameter of the holes punched in them. The space also between the holes in the finer plates should not be greater than the diameter of the holes, in the medium plates half a diameter, and in the coarser plates one-third of the diameter of the holes. The simple hand-sieve is the most ancient form of apparatus for sorting and concentrating ores in water, and it is still in use. Numerous modifications have been made from time to time with the object of increasing the product by increasing the size of the sieve, and supporting it in a frame, and by substituting machine power for that of the hand. Much attention has also been directed to the construction of automatic or continuously working jigs, by which the stuff to be washed enters in a constant stream, and after being washed and concentrated is delivered in two separate portions without stopping or requiring manipulation. In such machines the sieves, instead of being alternately plunged into and raised out of a vessel of water, are made stationary, are fixed firmly in a tub, and the water is made to alternately rise and fall so as to pass in a strong current through the meshes of the sieve, and the layer of ore above it. This motion of the water is produced by means of plungers or pistons acting below the sieve, either vertically or horizontally, or by elastic diaphragms. To permit of the ready discharge of the ore a valve was introduced in the centre of the sieve. At first some difficulty was experienced, because when the concentration had been effected, upon the grate opening the valve caused such a current that the waste stuff was carried down with the rich material. To prevent this difficulty, Mr. Vogel, of Joachimsthal, and Mr. Wimmer, of Clausthal, covered the central outlet for rich stuff by a tube supported by a bar of wood above, and reaching down through the layer of poor stuff so low that only the heavy and richer portions resting directly upon or near the sieve can pass downward into the discharge pipe. A similar machine in use in the Harts, has a perforated cylinder surrounding the outlet in the sieve, and the bottom of the hutch is inclined towards a central orifice, so that it becomes self-discharging. But the most simple and effective machine is, no doubt, that of Mr. Rittinger, in which the grates are slightly inclined, a low partition at the front being so arranged that the poor and lighter stuff falls continuously, and with very little water, while the heavier and richer portions fall through the opening at the base of the partition. Experience has shown that the duty of self-acting machines of this kind is generally three times as great as that from the ordinary intermittent working apparatus. Messrs. Huet and Geyler have designed a machine for the same purpose, but it appears too complicated and expensive for practical use. The other apparatus mentioned require no special notice.

* Abstracted from Official Report of United States Commissioners to Paris Exhibition, 1867, for which we are indebted to Prof. W. P. BLAKE, Department of State, Washington, U.S.

GEOLOGICAL SOCIETY OF LONDON.

June 22: JOSEPH PRESTWICH, F.R.S. (President), in the chair.

Horace Pearce, 21, Hogley-road, Stourbridge; and Samuel Spruce, of Tamworth, were elected Fellows of the Society.

1.—"Notes on the Lower portion of the Green-slates and Porphyries of the Lake District between Ulleswater and Keswick," by H. Alleyne Nicholson, M.D., D.Sc., M.A., F.R.S.E., F.G.S., lecturer on Natural History in the Medical School of Edinburgh.

The author describes the characters presented by the lower part of that series of rocks named by Prof. Sedgwick the "Green-slates and Porphyries," which overlie the Skiddaw slates in the Lake District. He notices the sections of this series in Borrowdale, on the east side of Derwentwater, between Keswick and the Vale of St. John, in the Vale of St. John, in Matterdale, in Eycott Hill, between Ulleswater and Haweswater, and in the neighbourhood of Shap. In the Borrowdale section the sequence of the rocks is given by the author as follows:—Resting on the Skiddaw slates there are (1) a felspathic trap; (2) a great series of ashes, breccias, and amygdaloids, often showing slaty cleavage and worked as slates, but with several intercalated bands of trap; and (3) a second trap. This appears to be a normal section, and is repeated, but diversified by the results of folding and faults in the other localities described by the author, except that in the Vale of St. John the true slaty series seems to be entirely wanting.

2.—"Observations on some Vegetable Fossils from Victoria," by Dr. Ferdinand von Müller and R. Brough Smyth, Esq., F.G.S.

3.—"Note on some Plesiosaurian Remains obtained by J. C. Mansel, F.G.S., in Kimmeridge Bay, Dorset," by J. W. Hulke, F.R.S., F.G.S.

4.—"Notes on the Geology of the Lofoten Islands," by T. G. Bonney, M.A., F.G.S., tutor of St. John's College, Cambridge.

The author described the general appearance of the Lofoten Islands, which have commonly been described as composed of granite, but which he stated really consist of gneissic rocks. The scenery of some of the islands, on which he did not land, resembled that of the Cambrian and Cambro Silurian districts of Wales and Cumberland; and the interior of Hassel showed dark rounded fells, resembling in outline some of the softer Welsh slates. At Stokmarknæs and at Melbo there is a granitoid rock of pinkish-grey colour, consisting of felspar and platy hornblende, with some mica and quartz. The Svolvaer Fjeld in Ost Vaagö shows a distinctly bedded structure in the cliffs near Svolvaer, the debris at the foot of which consist of a rock resembling syenite, and a quartzite containing a little hornblende and felspar. Bedding was also observed towards the Oxnæs Fjord. The islets near this coast consisted chiefly of a granitoid rock resembling a syenite, showing traces of bedding to the west of Svolvaer. Seams and veins of quartz, hornblende, &c., occurred in some of the islets, and these were sometimes too regular to be explained by deposition in fissures. Near the Svolvaer post-office there was gneiss coarsely foliated, containing hornblende and mica, with pink orthoclase felspar. The author concluded, from his observations, that, with few exceptions, the so-called granites of the Lofoten Islands are stratified, highly metamorphosed rocks, quartzites, and gneiss, generally with much felspar in the latter, and with more or less hornblende in both, and that they are inferior in position to the gneiss and schists of the mainland, and to the more slaty rocks of the southern and western parts of the same islands. He compares them with some gneiss from Dalbeg on west coast of the island of Lewis.

5.—"On *Dorypterus Hofmanni*, Germar, from the Marl-slate of Midderidge, Durham," by Albany Hancock, F.L.S., and Richard Howse: communicated by Prof. Huxley, F.R.S., F.G.S.

6.—"Observations on Ice-marks in Newfoundland," by Staff Commander J. H. Kerr, R.N., F.R.G.S.: communicated by the Royal Geographical Society.

7.—"On the Glacial Phenomena of Western Lancashire and Cheshire," by C. E. De Rance, F.G.S.

The author described the general form of the ground and the pre-glacial condition and glacial deposits of the districts of Wirral and Western Lancashire, and draws from his observations the following general conclusions:—That before and at the commencement of the glacial epoch the north-west of England was more elevated above the sea level than at present, but afterwards gradually subsided, during which process marine denudation produced the plains of Wirral and Western Lancashire. Part of the latter has since been covered with glacial deposits 200 ft. thick. The valleys running in the strike of the Triassic strata appear to have been formed by subaërial agencies. It is probable that when the glacial epoch commenced the hilly country was covered with immense glaciers, or with an ice-sheet, which, as the land sunk, reached the sea. The high level lower boulder clay was probably produced by this land-ice. The land continued subsiding until it stood 100 ft. lower than at present, submerging the lowlands of Lancashire and Cheshire to a depth of rather less than 25 fms., the coast-line being surrounded by an ice-foot, which received on its surface quantities of pebbles and boulders from the lake district. These, on the breaking up of the ice-foot, were spread over the lowlands, forming the low level lower boulder clay. The climate then improved, although subsidence still continued, and the sandy and gravelly deposits of the middle drift were produced; these deposits, at whatever elevation they occur, having been found in shallow water during the constant subsidence of the coast-line. The surface of the middle drift shows traces of what seems to have been subaërial erosion, leading to the supposition that the land must have risen and suffered denudation before that depression during which the upper boulder clay was deposited, at which period the climate again became extremely cold, and fresh glaciers were formed. Before the elevation of the upper boulder clay the climate was greatly ameliorated.

8.—"On the Pre-glacial Deposits of Western Lancashire and Cheshire," by C. E. De Rance, F.G.S.

The author believed that after the deposition of the Esker drift the country rose to from 200 to 300 ft. higher than at present; but in the course of this elevation there was a pause, during which denudation took place, and the low plains, now covered with peat-moss, came into existence. From the consideration of the present depths of the Channel between Great Britain and Ireland, the author inferred that an elevation of 200 ft. would have caused the coast-line to run from the Mull of Galloway to St. David's Head; and Ireland would have been so connected with Wales as to render possible the migration of mammals, plants, and of man himself. Glaciers probably still persisted in the lake district during the whole of this period of elevation. During a subsequent subsidence drainage became greatly obstructed, peat was formed, the sea encroached upon the land, and worked its way eastward over the sea bottom of postglacial times, a movement yet in progress. Here and there sand has begun to blow, forming dunes.

9.—"Observations on Modern Glacial Action in Canada," by the Rev. W. Bleasdell, M.A., Rector of Trenton: communicated by Principal Dawson, F.R.S., F.G.S.

10.—"On an Altered Clay-bed and Sections in Tideswell Dale, Derbyshire," by the Rev. J. M. Mello, M.A., F.G.S.

The author describes the sequence of the rocks seen in a quarry in Tideswell Dale as follows:—Beneath a thin layer of surface soil is a bed of toadstone, containing concretionary balls, and much decomposed above; beneath this is toad-

stone in large blocks of indefinite shape, very hard, dark green, and apparently doleritic, 9 or 10 ft. thick, passing downwards into a coarse and much decomposed bed, partly amygdaloid, partly vesicular, about 1 ft. thick. Beneath the toadstone rocks, and without any sharp line of demarcation, is a thick bed of indurated red clay, 3 yards in thickness, presenting a regularly prismatic columnar structure, resting on a thin bed of greenish-yellow clay, containing fragments of limestone, which covers beds of good Derbyshire marbles containing corals. The author suggests that the columnar clay-bed may perhaps be a local development of that which forms partings in the limestone near Litton Tunnel.

11.—"On the Physics of Arctic Ice as explanatory of the Glacial Remains in Scotland," by Dr. Robert Brown, M.A., F.R.G.S., &c.; communicated by Prof. Ramsay, F.R.S., F.G.S.

EXCURSION OF THE MEMBERS OF THE DUDLEY MINING INSTITUTE TO BELGIUM AND THE RHINE.

The members of the South Staffordshire and East Worcestershire Institute of Mining Engineers started on their chief annual summer excursion on Saturday week, from Dudley, and included Mr. North, the president of the institute; Mr. David Peacock, the ex-president; Mr. Henry Johnson, the hon. sec.; several members of the council, and other members and their friends, numbering twenty-seven in all. They started from Dudley at 10·10 on Saturday, by special saloon carriage, and arrived at Harwich, on the East Coast, at 7 P.M.; left Harwich at 8 the same evening, by the steamer Pacific, and after a very pleasant night's run reached Antwerp, where they arrived at 10 on Sunday morning. The steam up the River Scheldt for about 50 miles, to Antwerp, on such a bright sunny morning, with the great spire of Notre Dame Cathedral in sight, was very delightful, and was hailed with pleasure by those who had probably for the first time spent a night on the German Ocean.

On their arrival at Antwerp (Hotel de l'Europe) the party proceeded to inspect the Cathedral, with its magnificently carved spire tapering with faultless symmetry, and presenting in the distance an appearance of lace work; while the interior of the edifice had its chief attraction in Rubens' "Descent from the Cross." Other churches in the city—St. Jacques, St. Paul, and the Church of the Jesuits, with their splendid altar pieces and paintings—were visited with great interest. The Museum, a well-appointed collection of the old masters, seemed to some extent shorn of its glory by the absence of Quentin Matsys' *chef d'œuvre*, "The Dead Christ," which is in process of restoration. Considerable excitement prevailed during the day in connection with the annual procession of *La fete Dieu*. Upwards of 2000 persons, each bearing lighted tapers, marched through the principal streets, with bands of music playing, priests chanting, and all the insignia of Catholic pomp. High mass was celebrated by the Bishop of Antwerp in the large market place, where an altar had been erected for the occasion. After visiting the spacious docks constructed by Napoleon I., the fortifications, the Hotel de Ville, the picture gallery of Baron Notter Bohm, and the Zoological Gardens, the party proceeded to Brussels. Though the streets and public buildings are eminently modern in style, and, in fact, have earned for this city the title of "Paris in Miniature," the capital of Belgium is by no means devoid of antiquarian interest. The principal objects of attraction visited were the Museum (chiefly specimens of the Flemish school), the Cathedral, the Hotel de Ville, the Houses of Parliament, and the Park, not forgetting the famous Manneckin Fountain. On Tuesday morning the party drove in private carriages to the village and field of Waterloo. Especial interest was felt in the farm of Hougoumont, where there are still to be seen traces of that memorable struggle which terminated the career of the ablest general of modern times, and guaranteed the peace of Europe. After marching over the chief places of interest connected with the battle, and possessing themselves of sundry relics (genuine or otherwise), the party returned to the Hotel de l'Europe, at Brussels, and left the same evening for Mons.

The party having arrived at Mons, which is situate on the north end of the Belgian coal field, were kindly conducted by M. Lambert, the Government Inspector of Mines for that district, to Charbonnage de l'Agrappe (Belgian Coal Company), at Grissaut. Here, under the guidance of M. Fellicien l'Heureux, the underground manager, fifteen of the visitors having attired themselves in the Belgian miner's blue blouse and pantaloons (much to the amusement of the Belgian operatives present), descended the pit, a depth of 530 yards, and proceeded to make an inspection of the workings in the Chauffounoire seam. In this pit, as in the whole of the Belgian coal field, the coals lie at a very high angle, and in a zig-zag and irregular form, resembling streaked lightning. The angle at which the Chauffounoire seam was here being worked was as much as 88°, and was being worked long wall, with gob roads. The coal, as soon as it is loosened, rolls down by its own gravity in the levels, which are carried at different heights from the shaft across the contorted seams. The winding-shaft is 14 ft. diameter, and 700 men and females are employed in and about the mine. The visitors were very much struck to find that on their arrival at the pit bottom, and in the innermost recesses of the mine, that females from 12 to 50 years of age, were employed loading the coals into the tubs. Their dress is a tight-fitting buttoned-up jacket and trousers, made of coarse light-coloured "hurden," with a blue turban-sort of cover for the head. They skip into the cage, and go down to work in depths of 530 yards with far more alacrity than the boys or men do in Staffordshire. They seem very cheerful and contented, and earn 1s. 3d. to 2s. 1d. per day. Married women work in the pits as well as single, and, on enquiring from disinterested persons, it is said that their morals contrast favourably with those females employed in the factories. At this colliery twenty workpeople are lowered and raised at a time. The coal hewers earn about 2s. 9d. per day of 10½ hours, and the coal-raising goes on night and day. Nearly all the pit tops in the coal field are covered over by a large brick building, so that the work of landing and sorting the coals can be carried on in great comfort in wet weather. The party stayed at Mons on Wednesday night, and left for Charleroi on Thursday, at 9 A.M.

Mr. Lambert, the Government Inspector of that district, here met the party, and kindly conducted them to the Charbonnage de Saire Madame, where a very interesting piece of mining engineering has just been completed. The old shaft here was 6 ft. 8 in. diameter, and 650 yards deep. The improvement referred to has been the widening of this small pit to one of 13 ft. 4 in. for a depth of 650 yards, without stopping the working of the pit a single day. This enterprising piece of work has occupied about two years, and has been most successfully accomplished. The party were then conducted to the pits of the Charleroi Coal Company, where, in an oval pit shaft, 21 feet by 12 feet, a great slip has taken place, at 490 yards from the surface, and carried away the lining of the shaft and the strata with it, a distance round the pit of 7 yards. This is now being successfully repaired by a special piece of engineering.

The party then proceeded to examine the blast-furnaces of the Société de Eny-le-Chateau; manager, Monsieur Blondion. The furnaces are constructed on first-class principles, as the production of iron will show, 52 tons being cast from one furnace in 24 hours. The iron ore used is principally of a red colour, and comes from Namur and Luxembourg. Coke is used for fuel, not coal, as in South Staffordshire. The blast-engine is a vertical one, the blowing tube standing above the steam cylinder; the pressure of blast produced averaging about 3½ lbs. to the square inch. The boilers and hot-air ovens are heated by the gases from the furnace tops, which are taken off by means of a round cast-iron cylinder, protruding 5 ft. 6 in. into the body of the furnace. The iron ore is of such a nature that it keeps continually caking in the cylinder, enclosing the gases, which are drawn off by the stack, round the outside of the cylinder, through the descending tubes to the boilers and ovens. After a thorough scrutiny, a move was made to the iron works of Mons. Richie and Co. Here the courtesy shown to the party at other places was a little wanting, for the manager seemed disinclined to give any information. The works are well laid out, and consist of three mills and a forge train. The forge contains nine puddling-furnaces, in which slack is used. The iron is not shingled, but worked in crocodile squeezers. There are two vertical engines, having their cylinders above. The first one drives the forge-train, slitting-mill, shears, and squeezers; the second the merchant-mill and guide-mill. To each of the last two mills there two heating furnaces. The production of these works is 700 tons of finished iron per month. It may here be stated that we particularly noticed the great attention paid at the blast-furnaces to the mixing and distributing of the iron ore, &c. In the first place the ore is well broken up into small pieces, and saturated with water; this causes it to cake in the furnace. The various proportions are then mixed together and distributed on the top of the coke and limestone in the furnace. To the foregoing facts must undoubtedly be attributed a great yield, and a better quality of iron.—*Birmingham Daily Post.*

OLD MINERS' FRIENDLY SOCIETY.—The annual meeting of this old-established society was held at the Bedford Hotel, Tavistock, Mr. J. H. Gill in the chair, who, in proposing the "Old Miners' Friendly Society," said he thought such societies as these were most essential to the working miner, by which they were assisted in their afflictions. Of the moral character of the miner he could speak most satisfactorily, as from his capacity as magistrate he found it a very rare exception for any miner to be brought before him for transgressing the law of his country.—The committee, in presenting the sixty-sixth annual report, feel sure the best thanks of the society will be heartily given to the following gentlemen who have come forward so handsomely in support of its claims:—Messrs. J. H. Gill, R. Gill, Messrs. Taylor, T. Nicholls, Pearse and Northey, R. Bayley, Jos. Paull, Lieut. Mathews, Ensign Mr. Bridgeman, W. Mathews, J. J. Daw, and Messrs. Lang, of Bristol. With such good friends to aid their efforts, the committee look with great confidence to the future prosperity of this old and valuable institution. The committee for the ensuing year are—Capt Clemo, Capt. Bray, Messrs. S. Drake, J. Nancarrow, N. Williams (1st), F. Cock, R. Castle, J. Harris, T. Clemo, J. James, and J. Whitford. the treasurer, Mr. J. Webb, and the secretary, M. W. H. B. Barnett. The financial statement showed that during the year 40 members had received sick pay, amounting to 177l. 11s. 3d.; for funerals, 47l. 10s. had been paid; and for general expenses, 12l. 17s.; which, together with a balance of 8s. in hand, made the expenditure 238l. 6s. 3d. The contributions for the year amounted to 152l. 3s. 9d.; amount withdrawn from stock, 85l.; this, with a balance of 11. 2s. 6d. brought on from last year, makes the total of 238l. 6s. 3d. The amount of funds in the bank is 37l. 6s. 8d.—Mr. J. James, sen., considered that as the Duke of Bedford had taken so much money from the mining interest of the neighbourhood he ought to subscribe to the society's funds.—Mr. T. Nicholls, in proposing "Mining and the Town and Trade of Tavistock," said that both mines and miners did need success. They had a battle to fight with foreign countries, and when it was said that mining affected the trade of the town it should be remembered that it affected the working men also. At present the price of copper was very low. A short time ago tin was low; now it was up to a good price, and he hoped that copper would soon follow in that direction. He was sure they would all join with him in the desire that Devon Great Consols would assume its old position. Old Wheal Russell was looking bright, and the adventurers were in anticipation of receiving dividends at no distant date. When they saw gentlemen continually taking money from their pockets and investing in mines without any return being made, he thought the Duke of Bedford ought to give up the dues.—Mr. Pearse said it had occurred to him that they made a mistake relative to the distribution of their sick pay. It was usual to give the highest rate of pay when the member was confined to his bed, a time when his requirements are few; and when he was able to get about, and required nourishing things to increase his strength, the pay was reduced. This was a decided mistake. Many men would be better walking about than in bed, but the inducement was in favour of the latter course.—The Chairman thought the suggestion made by Mr. Pearse was a good one, and worthy the consideration of the committee.

FOREIGN MINING AND METALLURGY.

French colliery owners and coal merchants show a certain hesitation in renewing their contracts. Supplies are not more considerable than formerly; the wants of consumers are on the increase, and the stock of disposeable coal is diminishing every day in the Nord and the Pas-de-Calais, where the production is engaged for some time beforehand. It is expected that the terms upon which most contracts will be renewed will be an advance of at least 1s. 8d. per ton on the prices of last year; even at this advance coal workers will, probably, show themselves indisposed to enter into contracts for long terms, as they are now overdone with orders, and expect even a further advance in quotations. The draught of water in the rivers and canals has diminished, and an advance in freights will, probably, still further increase the price of coal. Already freights are advancing in the Nord and the Pas-de-Calais, and the advance displays a tendency to extend itself also to the other basins. As regards the French iron trade, it may be observed that all articles mantain a satisfactory tone upon the Champagne markets; there is a well-sustained current of orders, and prices display considerable firmness. Coke-made iron has brought 8*l.* 4s.; mixed ditto, 8*l.* 12s. to 9*l.*; and puddled charcoal-made ditto, 9*l.* 4s. to 9*l.* 12s. per ton. The Champagne foundries are working with much activity; not only have they orders to execute which they receive direct, but they are also engaged upon orders from other establishments, which are at present idle in consequence of strikes. The state of affairs in the Moselle group displays little change. White pig has made 2*l.* 18s. to 3*l.* 0s. 6d.; speckled ditto, 3*l.* 0s. 9d. to 3*l.* 2s. 6d.; grey refining pig, 2*l.* 19s. to 3*l.*; No. 1 pig for second fusion, 4*l.* 4s.; No. 2 ditto, 3*l.* 16s. to 4*l.*; No. 3 ditto, 3*l.* 12s. to 3*l.* 16s.; No. 4 ditto, 3*l.* 8s. to 3*l.* 12s.: and No. 5 ditto, 3*l.* 4s. to 3*l.* 8s. per ton. Rolled iron from coke-made pig has made 8*l.* 4s. to 8*l.* 8s.; pipes of ordinary dimensions, 6*l.* 12s. to 6*l.* 16s.; forging plates, 5*l.* 8s. to 5*l.* 12s.; solid columns, 5*l.* 12s. to 5*l.* 16s.; and hollow columns, 8*l.* 8s. to 8*l.* 16s. per ton. The Villerupt and Ottange furnaces are forwarding a good deal of pig to Styring Wendel. Hayange has a second blast-furnace lighted. An establishment in the neighbourhood of Carignan receives pig from the Meuse, and sells very good grey pig at 3*l.* 17s. per ton. The Rosselle Colliery, and two other neighbouring concessions are loading every day 115 to 120 coal wagons, at 9s. 3d. to 9s. 9d. per ton at the pit's mouth. Official returns show that 3194 tons of iron and 1716 tons of castings for building purposes entered Paris in April, as compared with 13,798 tons of iron and 4111 tons of castings in April, 1869. A strike among the working ironfounders of Paris, which has been going on for some time, is not yet adjusted; the men are encouraged in the strike by their brethren in the provinces and abroad. A number of patterns have been sent to Amiens and Toulon, to be cast there, but they are said to have been returned, the workmen of those towns refusing to do the work declined for the present by their Parisian brethren. The committee formed for carrying on the strike has been sending almost every day workmen from Paris into the departments, with what object it is easy to divine. A deputation of industrials from the North and East of France, introduced by Baron de Lesperut, has been received by M. Pilchon, Minister of Public Works. The object of the deputation was to ask that in future navigations on the canals should only be suspended every three or four years, that the stoppages should be simultaneous upon all the canals between the North and East of France, and that an enquiry should be instituted in order to determine the least unfavourable period for stopping navigations. The deputation also asked that all the canals of the North and East of France should be made of the uniform depth of 7 ft. 8 in.; that a canal from the Oise to the Aisne should be executed with the least possible delay; and that the suspensions of navigation this year on the Aisne and on the canal from the Aisne to the Oise should be simultaneous, and should be reduced to eight days. The minister assented to the last of these applications, and also promised favourable consideration of the second and third. The minister further promised that some improvements should be carried out, if possible, in the great navigable line from Dunkerque to Bâle. The Châtillon and Commentry Forges Company realised last year a profit of 55,154*l.*, while 1868 had produced only 37,676*l.* After making various additions and deductions, the balance available for dividend was 32,758*l.* Of this sum, 30,000*l.* was applied to the declaration of a dividend at the rate of 1*l.* 4s. per share, the balance of 2758*l.* being carried to the statutory reserve. The dividend for 1868 was only 1*l.* per share. The shareholders have approved the acquisition by the company of the Ouche-Bezenet Colliery.

A Russian Industrial Congress has just been held. The second section discussed the question to what extent the manufacture of rails could be carried with success in Russia. There was some diversity of opinion on the subject, but three speakers indicated districts where they thought the manufacture of rails might be carried on with success in Russia—the basin of the Donets, the Oural, and Dombrow, in the kingdom of Poland. The Congress adopted a resolution expressing a wish that the most energetic measures should be undertaken to establish the manufacture of rails at the three points mentioned.

The Belgian coal trade continues in a very satisfactory state. In all the workings operations are being carried on with the greatest activity, and yet the orders received can be scarcely carried out. Large deliveries are being made by railway trucks; the period is anticipated when plant will again make default, and it is said that the complaints of last year will be renewed in September. Railway companies are urged by the industrial press to be warned in time, and not to forget the season for the production of sugar from beetroot, which is one of great importance to coalowners. There are rumours of negociations with reference to iron contracts of some importance to be executed in the course of next year; at the same time, nothing definite has been yet decided on. The Belgian Railway Engine and Plant Company has received an order for all the passenger carriages and goods trucks required for a line 65 verstes in length, which will unite Liwny, in the Government of Orel, to the line from Yeletz to Orel; the locomotives for the Liwny line will be supplied by Messrs. Sharp and Co., of Manchester. The Sclessin Blast-Furnaces and Collieries Company, M. Bellefroid, of Herstall, MM. Durieux and Co., of Louvain, MM. Nicaise and Delcuve, of La Louvière, and MM. Rolin and Co., of Braine-le-Comte, have concluded working arrangements with MM. Charles Finot and Co., who are exclusively charged with negociations relating to the supply of girders and other descriptions of iron for Italy, Spain, Portugal, Turkey, and the Danubian Principalities. The Austro-Belgian Metallurgical Company will pay, on July 2, a second dividend for 1868-9 of 6s. per share.

The continental copper markets have maintained previous quotations. At Paris, Chilian in bars, to be delivered at Havre, has made 69*l.*; ditto in ingots, 73*l.*; tough English, 72*l.*; and Corocoro minerals, pure copper, 71*l.* 8s. per ton. The German copper markets have supported previous rates with firmness. At Rotterdam, Banca tin has been dealt in at 78 fls. to 78¼ fls.; Billiton has made 77½ fls.; Billiton under sail makes 75 fls. to 77½ fls., prices varying according to the date of the delivery. At Amsterdam tin has been held rather firmly; the quotation is 78¼ fls. to 79 fls. for disposeable Banca, and 75¼ fls. to 75½ fls. for Banca to be delivered in October and November. The stock of the Society of Commerce for the approaching sale is stated to be about 95,000 ingots. Lead has not presented much change. At Paris, Silesian zinc, to be delivered at Havre, has made 19*l.* 16s. per ton, while other good marks to be delivered at Havre have brought 19*l.* 12s. per ton. Some considerable transactions have taken place at Breslau of late; nevertheless, the tone of business at that important zinc centre is stated to be rather feeble.

FOREIGN MINES.

ST. JOHN DEL REY.—The directors have received, per Sindh, the following report, dated Morro Velho, May 28:—Morro Velho produce, second division of May, 11 days, 3860·9 oits.; yield, 2·712 oits. per ton. This is better produce than the first division gave. Our supply of mineral will be about the same to the end of the month.

DON PEDRO.—Produce weighed to date, 4033 oits., estimate for May, 5533 oits. The works are progressing, but I have not the pleasure of reporting any "line" having been cut in Alice's west. The auriferous ground there maintains its size. No. 6 is, as last advised, disordered and poor. Some good work has been excavated from Canoa in underlie lode. We shall not be able to prosecute sinking Vivian's shaft until the extra power of water-wheel is brought to bear on horse engine. Good duty is being done at Treloar's, but I am sorry to report little progress at Middle adit. Surface works are being pushed on vigorously; a large force is at work on water-wheel to drive horse-engine, and a number of hands excavating for permanent pumping machinery.

ANGLO-BRAZILIAN.—Mr. F. S. Symons (May 30) reports: The works are being pushed on vigorously; the lode in Dawson's is not quite so large; at Haymen's it is of favourable dimensions, though standard will be proved when produce for month is cleaned up. At the Deep Adit section and Foster's there is no material change to report on.

GENERAL BRAZILIAN.—Messrs. John Moore and Co. advise that Capt. Treloar's despatches, which ought to have arrived in Rio on June 4, not having come to hand, would be too late for the present mail, but should be dispatched by first steamer.

ROSSA GRANDE.—Mr. Ernest Hilcke (May 28), reports: Mina de Serra: In the appearance of the lode there is little or nothing new to note. It continued improving in size in the 56 and 60 fm. level, and is at present at both placed from 4 feet to 5 feet wide; its breadth, however, does not extend much beyond the width of the levels, and, consequently, leaves no stoping ground. The lode in the shaft is split up and disordered, and that in the stopes continues very small. Taken on the whole, this mine is not looking so favourable as usual. In Cachoeira Mine the cross-cut has been well pushed on with, and will be into the run of the lode in a few days more. At Gongo Mine no changes of note have occurred. The operations are progressing with good speed.

TAQUARIL.—Mr. T. S. Treloar (May 28) writes: Operations generally are progressing apace. The pumping-engine is working well and doing adequate duty with one-half only of our water power, and, barring the failure of three or four pulley millilars, which were immediately replaced, no breakage of any kind has to date taken place. The sump-shaft since my last has been sunk 9 feet 9 in. The ground in the bottom is less favourable for removing, and water slightly increasing. Martin's cross-cut has reached the footwall of the top lode, and is now being carried on with the view of intersecting another lode said to be 6 feet under and running parallel with the one already encountered, latter is 10 feet in thickness, and contains gold bearing lines, which will eventually be extended upon. Meeting with these lines so far eastward of old shaft is a matter of no ordinary importance, and greatly enhances the company's prospects of success. The level direct to the bottom of the old shaft has been commenced at a depth of 43½ fathoms from surface, and will be prosecuted with all possible dispatch. In the deep adit fair progress is being made.

FRONTINO AND BOLIVIA (Gold).—The directors have their usual advices from the mines, accompanied by a remittance of 394½ ozs. of gold dust, produce for the month of April. The new mills were completed and would commence stamping about May 12. No mention is made of the telegram received by the company some time back.

EXCHEQUER.—Capt. Chalmers, May 30: During the week ending Saturday, the 28th inst., there have been 12 shifts employed in enlarging the hoisting-chamber, which will most probably be finished in about a week. The air-shaft has only been raised 2 feet, as but two shifts were able to work in it, in consequence of the bad ventilation, caused by so many men being employed in the old tunnel timbering where it had become dangerous. This work would have been done at the outset, but the difficulty of getting timber then prevented. About 31 feet has been re-timbered, and all will be made secure before resuming work in the air-shaft.

NEVADA LAND AND MINING.—J. J. Dunne, May 19: I am sinking a shaft on the Alpha Mine from the tunnel, to where I expect to strike a large body of ore. The shaft is now down 105 ft., and expect to have to go 70 ft. further. We are making about 2 ft. per 24 hours, working three shifts of eight hours each.

— J. J. Dunne, June 5: I have had several lots of ore from the Comstock lode, at Virginia city (paid Gould and Curry Company last week $29,000 for ore), and expect to get all the high grade ores mined there. The supply of ore from the Alpha Mine has fallen off, as I have been engaged in doing dead work—sinking a shaft, as I informed you; but the mill has been running constantly, on custom ores principally, with the exception of a few days when we were putting in a crusher for breaking rock for the batteries, which heretofore we have done by hand. The amount of bullion produced in May was $44,360, amount of ore purchased $33,199. I send by Wells, Fargo, and Co.'s express a bar of bullion, value $1268·19.

UNITED MEXICAN.—Guanaxuato, May 23: Mine of Jesus Maria y José: Little can be said regarding this mine, our workings being confined exclusively to throwing down ore from the reserves with the greatest possible economy. The buscones are extracting considerable quantities, but the average ley of their ore is lower than it was some months ago. The accounts for April show a small profit of $741. Our tortas have improved in ley, at the same time the outlay has undergone a considerable reduction.—Mine of Remedios: In this mine the workings do not improve. Northwards the ore gives out, but upwards, thus far, it continues, though lower in ley than in the lower workings. The accounts for April show a profit of $2194.—New Concern, Adit of San Cayetano: In the adit we advanced in April 11½ varas. We have traversed in the month a narrow vein, which looks pretty, but contains no silver in the part intersected.—Mine of Buenos Ayres: In the shaft we have reached the depth of the adit, and on the 2d May opened the cross-cut to the south, in which up to date we have driven 3½ metres. The rock in it is very hard. At about 10 metres I shall open eastwards towards the adit, and westwards in continuation of that work.—Mine of San Antonio de la Ovejera: The shaft on the 21st of May had reached 188 metres depth. Last week we cut a narrow strip of low ore in a quartz matrix in this shaft, and the lode itself cannot be far distant.

PESTARENA UNITED.—Thomas Roberts, Thomas Warne, June 23: The new water-course being made to give greater head to Peschiera winding-turbine, and for new machinery, has been excavated and secured by walls for a length of 310 metres, reaching to the head of the pipes; 123 metres of this water-course has been covered by a strong stonework arch, 36 metres open cutting, 31 metres covered with strong flat stone, all ready for staunching, which we calculate to do with clay and cement, and 120 metres will be launders. Stone pillars to support them are already built, and timber for the launders is now being got out. We have yet 58 metres to make for a discharge. This work is progressing favourably. Of late we have completed a house in place of one carried away by the flood in 1868, half the size that it was before; in this way not so much exposed to the Anza. The under part of this building is now used for dressing ore, and the upper part for the captains' changing room and pitmen's rooms, all of which are required. Other progress made on surface are preparations to carry water and ore to Hodgson's system wire-rope transport road. Of the water-course we have made and laid 33 metres of launders, boards for 45 metres more are already got out, and will be put in place in three days after the ropes have been stretched, or when we see their driving-power further advanced. In addition to this, we have excavated and secured a pit for the turbines intended to drive the ropes, and outlet from same 18 metres, reaching to the Anza River. At the terminus of the rope-road we have in a forward state a deposit for the ore, also a tramroad 85 metres, when finished from the old dressing-floors leading to the deposit. Both roads and deposits will be ready in time for the ropes to take the ore from Pestarena.—Underground, Aquavite: We have made a commencement to lay the pipes to give a greater head of water to the Aquavite winding turbine, and have the greater part of the work ready for the pump motion now being placed in the 46, to a sink reaching to the 55; at the head of this sink bob and connecting-rod have been fixed. The lode in the bottom of this mine, or 55 north, yields 4 tons of ore per fathom, worth 1 oz. of gold per ton. The 46 end south yields 4 tons per fathom, worth 15 dwts. per ton. The stopes in bottom of the 23 yield 10 tons per fathom, at 1 oz. per ton. Stopes in back of the 23 yield 8 tons per fathom, worth 10 dwts. per ton.—Peschiera: The stopes in bottom are without change, yielding an average of 7 tons of ore per fathom, worth 1½ oz. of gold per ton. The lengthening out of the tramroad at the 46, on No. 2 lode, is being laid as fast as the stopes are carried forward. The stopes in bottom, on No. 5 lode, are not looking so well. The western part of No. 2 is a well-defined lode, yielding an average of 7 tons of ore per fathom, giving 10 dwts. of gold per ton by the mills. The stopes at the 16, on No. 2 lode, yield 8 tons per fathom, worth 10 dwts. per ton. The incline shaft, near the north end of the great course of ore in the Peschiera, from the 65 to the 75, has been completed, and part of the pumpwork put in place. We intend to make good progress on this pump construction during next month.

CAPE (Copper).—The directors have despatches, per Briton, to May 7, in Namaqualand. The mines of Ookiep, Koperberg, Springbok, and Nababeep are reported upon. At Nababeep the appearances have again improved; but no other change of importance is reported in the above-named mines. The Spectakel report will for the future be sent by second mail, but the superintendent writes that the mine continues to improve. The formation of road for tramway was completed to the 37th mile, and plate-laying had been resumed.—The Cape Hope agent writes on May 19: It it with much pleasure we report that splendid rains have already fallen, not only in Namaqualand, but throughout the colony generally. Returns—Yield, Ookiep, 488 tons; Spectakel, 115 tons; transport, 295 tons. The Ocean King and Taena were on the coast, and would load together 1100 tons.

RHENISH CONSOLS.—Capt. Sweet, June 25: Christiania: We have started a sink east of the cross-cut, in the bottom of the 20; the lode at this point will yield 2½ tons of lead per lachter.—Madonna: We have intersected the main lode in the bottom of Reed's shaft, and, so far as laid open, it presents a good appearance, worth for lead from 15*l.* to 20*l.* per lachter. When Mr. Darlington returns he will give you more particulars about this mine and Bliebach

WILDBERG.—Capt. Sanders, June 23: East Mine: The drivage at the Erbstollen is now advancing in an easterly direction, in a lode composed of quartz, and vein schiefer. Stones and branches of ore exist in proximity to the footwall, and as the lode is opened to a farther extent it is hoped it will become more valuable. Ancient workings in the 20 lachter level extend between Strassen and Carolinen shaft a length of 40 lachters, and we, therefore, anticipate finding productive and valuable ground as we proceed eastward.—Conder's 70 Drivage: The drivage commenced immediately south of Conder's winze is extended 18 lachters to the southward, and a lode or channel of ground, composed of mineral distinct from the country rock. Now and then stones and spots of ore are met with. The ore ground in the Erbstollen drivage probably will strike the 70 some 10 or 15 lachters further south. Every effort will be made to expedite the progress of the level, but I regret to say that our progress hitherto has been slow, owing to the Erbtiefstergang Erzkammer. The forebreast of this level, west of Carter's shaft, is in contact with the Johanne's trune, and within 5 lachters of the Dornergang level. This piece of intervening ground is, probably, composed of lode stuff, intermixed with ore. The length of ore ground in the Erbtiefstergang Erzkammer is about 12 lachters, its width 2¼ lachters, yield 1 to 1¼ ton of ore per cubic lachter. The vein-stone is not rich, nevertheless, the large quantity available renders this part of the mine of considerable importance. It is tolerably evident that the three lodes—Erbtiefstergang, Dornergang, and Johanne's trune, are together at the 70 forebreast, and form an enormous width, intersected with a great number of keufts or vein-fissures, some of which may carry large quantities of ore.—Dornergang, Davey's Workings: Immediately opposite Davey's workings a cross-cut is being driven southward, in an orey part of the lode, at a distance of 4½ lachters. In the present forebreast schiefer is met with, carrying thin branches of ore. The point of this cross-cut is about 16 lachters distant from the Erbtiefstergang Erzkammer.—Johanne's Sink: This sink divides the ground between the 50 and 60; it is sunk on the junctions of the Johanne's trune with the Dornergang, and commands the Gotteshulfe, scarcely yet worked below the adit. The ore in the ground around the sink is being extracted on tribute, yielding at present 1½ ton per cubic lachter.—Weitungsmittel: This portion of the lode is 7 lachters long, and will yield 1¼ ton of ore per lachter. It has not been seen in the 60 lachter level, but search will be made for it by a south cross-cut.—Dornergang Erzkammer: The ground above the adit continues to yield the average quantity of ore—1 ton of ore per lachter.—Beck's Workings: The extension of the cross-cut north at the 70, immediately under Lemgenfeld's sink, has been attended with no satisfactory results. The forebreast now appears to be in the dead country rock, indeed, to have passed beyond the footwall of the vein. Search is being made for Langehfeld's shoot in the 60, and at a point further westward. The ground in this locality is set on tribute, and the men are likely to get a fair return for their labour.—East Blumengang: The ground in the 70 will afford 2 tons of ore per lachter. In the 60 westward the level is running in schiefer, affording stones of ore.—70, West of Beck's: The disposition of the ore ground in the Blumengang, the desirability of throwing further light on the structure of Beck's lode, as well as the speculative value of the ground intervening between the Blumengang and Beck's workings, justify the extension of the 70 lachter level westward. Should a discovery of ore be made, it will be available for some distance above the adit level, and show that the hillocks at the surface were in some measure the result of productive explorations. At present nothing is known of the lode or of any workings between the East Blumengang, a length of 70 lachters, and from the surface to the adit, a depth of 25 lachters.

[For remainder of Foreign Mines see to-day's Journal.]

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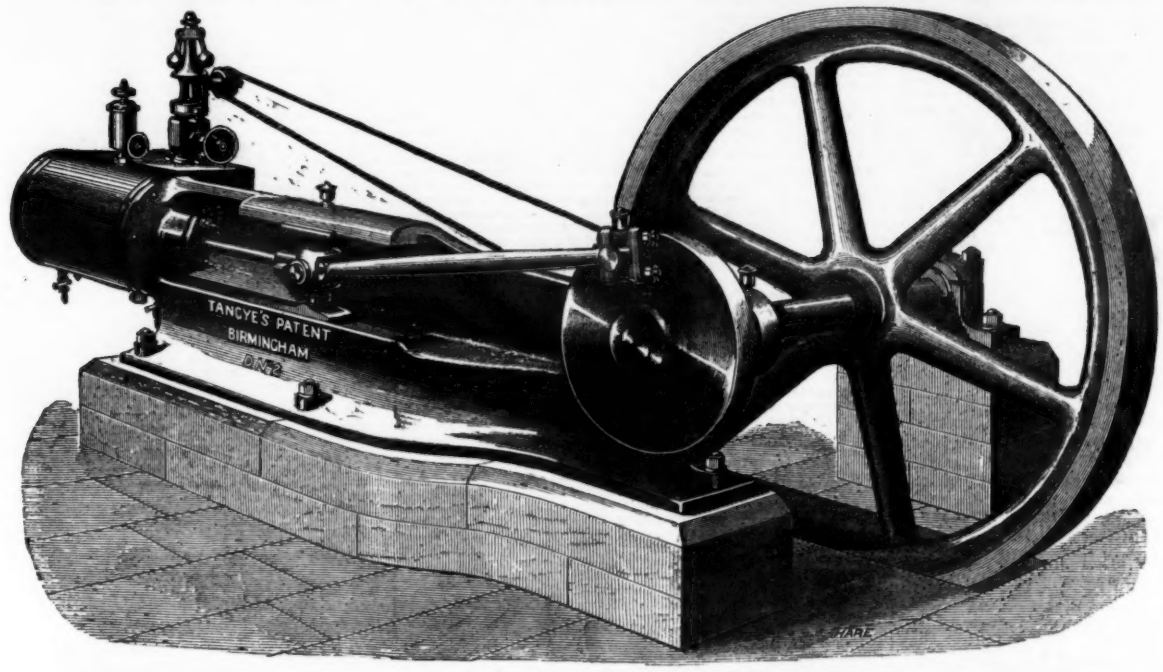

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